IBS NEWSLETTER

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#58/59-5 February 14, 1959

COMMISSIONER HYDE IMPLIES COMMISSION ILL-INFORMED

F.C.C. Commissioner Rosel H. Hyde told I.B.S. last month that the Commissioners were not aware of the implications of the proposal to delete campus calls. It now appears that a very incomplete picture of the situation was presented to the Commission at its October 18th meeting at which assent to the deletion of campus calls was given (see Newsletter, #58-59-3, et seq.)

In a conference with I.B.S. staff members George Abraham and William Malone on January 9th, Commissioner Hyde was quick to agree that I.B.S. and the campus stations should have been heard. I.B.S. cited the lack of procedural regularity and confusion in the national advertising market as cardinal reasons for reversal of the Safety and Special Radio Services Bureau's new policy on call reservations.

As a result of the conference, I.B.S. General Counsel Vail W. Pischke directed a six page letter to Curtis B. Plummer, Chief of the F.C.C.'s Safety and Special Radio Services Bureau, which criticized point-by-point the Bureau's stand, concluding with the following remarks:

> "Our contention, expressed at the December 16 meeting, that the existence of two radio stations with identical call letters would create considerable confusion in the national advertising market, was confirmed in a letter from a national college radio advertising representative for college broadcasters. I.B.S. suggested that licensees of the Commission would be more upset by the confusion resulting from duplication of calls than by the unavailability of one-half of one percent of the

FOR STATION EXECUTIVES

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possible permutations.

At a meeting of the I.B.S. Board of Directors in Baltimore on December 29, it was concluded that respondents to the recent I.B.S. questionnaire felt that both the existing call letter policy and the proposed compromise were unsatisfactory both to the radio industry as well as to campus radio stations and therefore desired a return to the December 3, 1946, policy. Accordingly, I.B.S. seeks a restoration of the previously-existing policy . . .

Let me point out, in conclusion, that in my mind there are substantial property rights which are placed in jeopardy by the present policy of the Commission and that, unless the original status quo is once again placed in effect, we will have a case of deprivation of such rights without there having been an opportunity for my client to present its case, as is properly allowable under our administrative procedures today . . ."

Sources on I.B.S.'s Washington staff characterized the letter as FCC staff's last chance to reverse its position before the matter be formally presented to the Commissioners.

OPINIONS SOLICITED ON DOCKET 9288 PROPOSAL

I.B.S. has learned informally that a proposal will be presented shortly to the Commission in an effort to close out Docket 9288. Docket 9288 was established by the Commission in 1949 in an effort to secure agreement on limitations on spurious radiation from, inter alia, carrier-current stations and local oscillators. In 1949 and again in 1954, I.B.S. filed petitions on behalf of its member stations protesting proposed unrealistic limitations.

In its 1954 petition, I.B.S. proposed a limitation of 500 uv/m at 100 feet from the apparatus. It is understood that the current proposal envisions a limitation of 200 uv/m at 100 feet. While it is conceded that the 200 uv/m proposal is more liberal than the 15 uv/m at lambda over two pi rule now in effect, it appears from measurements available to the I.B.S. staff that only about 25% of the now-operating campus stations can comply. It is also recognized that the current proposal will be more easily enforced by the F.C.C. Field Engineering and Monitoring Bureau.

It is further reported that the Broadcast Bureau will not willingly accept campus stations under Part 3 of the Rules, as proposed by I.B.S. in 1954.

I.B.S. Engineering Manager William Malone requests member stations to offer comments on how the current proposal would affect their operations, submitting measurements in support of comments. Meanwhile, measurements are being made by I.B.S. on certain eastern carrier-current systems in an effort to determine the proposal's reasonableness.

FIRST MASTER HANDBOOK PUBLICATION APPROACHES 200 PAGES

Intercollegiate Broadcasting System's new Master Handbook was reported on the press the first week in February. Handbook editor Joseph D. Coons said that the first mailing would contain nearly two hundred pages.

The Handbook is designed to bring together articles on all phases of campus station operation, including engineering, sales, programming, licensing, etc. (see Newsletter 58/59-2, et seq.) The book is published in loose-leaf form so that stations will have a "fantastic collection of information which is always up to date," Coons said.

Stations were sent reply postcards in late January by which they could reserve copies and obligate themselves to keep the book up-to-date as supplements are released monthly.

Coons is anxious to receive special articles from System station personnel on sales and programming gimmicks, unique technical circuits and layouts, training programs, publicity efforts, etc. Articles may be submitted in any form to Coons, c/o Station WRUC, Union College, Schenectady 8, N.Y.

QUESTIONNAIRES REVEAL STATISTICS ON CAMPUS STATIONS

Replies to I.B.S.' annual station facilities questionnaires showed that campus stations employ total input powers (all transmitters totaled) ranging from 6 to 130 watts, with a median power employed of 10-12 watts. Hours of operation ranged from 11 to 168 hours per week, with a median number of 33 to 36.5 hours.

Eight respondents listed FM affiliates, of which six were non-commercial and two were commercial. Non-commercial powers ranged from 6 to 3950 watts; the two commercial stations reporting showed powers of 96 to 175 watts.

There are still a number of member stations which have not replied, and these questionnaires should be forwarded to Mr. Terry Bateman, Gallatin C-31, Soldiers Field 63, Massachusetts.

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- REGION AND STATION NEWS SECTION -

WRUC Compiles Engineering Records: WRUC has arranged with the Union College Department of Civil Engineering to allow students in the elementary drafting course that is required of all BS candidates, if they are already quite accomplished in the art of engineering drawing, to use the documentation of WRUC's facilities as a year-long or term-long substitute for their regular Freshman graphics program.

WRUC's Technical Director, Charles Pike, and Chief Engineer, Dennis Ricker, have drawn up a list of minimum requirements for men doing the job and have presented it to the college C.E. Department. It is expected that men are available with the necessary skills and that work will begin concurrently with the second semester.

Pike said, "I believe that this is an opportunity for stations to get a job done that they need, but seldom have enough manpower to do themselves; we cannot but be satisfied if the men chosen by the department have some knowledge of radio engineering practices."

WHRB-FM Receives Construction Permit: The Federal Communications Commission by the Broadcast Bureau on January 24 granted the Harvard Network's amended application for FM construction permit. The Harvard Network had requested a change in frequency and increase in power to 796 watts. The original application had been filed in January, 1958 (see Newsletter, #58/59-2, et seq.)

Construction will start shortly, Townsend Whitmore, Chief Engineer of WHRB-FM, stated January 30.

WESU Extends Coverage: The Wesleyan University station has completed installation of an r.f. distribution system permitting campus-wide reception. After failing to meet the mid-November deadline (see Newsletter #58/59-2), the Station's Chairman, Parker Bartlett, worked out an arrangement whereby the station would be penalized $100 each month the project remained incomplete. "With the added stimulus," Bartlett reports, "we were able to complete the renovation by January 1, 1959, and are now operating on a full schedule and being heard all over campus."

Borst Presides: I.B.S. President David W. Borst spent late January in New York City attending the Winter General Meeting of the American Institute of Electrical Engineers (AIEE). President Borst presented a Conference Paper and chaired one of the sessions. While in attendence, he conferred with I.B.S. staffers Dick Pittenger and Walter Hofer, and CRC executive Robert Vance, Jr.

WBRU Installing New Transmitter: Russell G. Weeks, Chief Engineer of the Brown Network, reports that WBRU is in the process of installing a new transmitter. WBRU operates on 560 kilocycles 130 hours per week.

- TECHNICAL SECTION -

How Yale Complied with Part 15: In the Spring of 1954 the Yale administration decided that the Yale Broadcasting Company, Inc., should comply with the F.C.C. rules concerning the operation of restricted radiation devices. Previously, the technical department of WYBC had considered reduction of WYBC's field strength to 15 uv/m at lambda over two pi impracticable. The problem was simply one of retaining a signal strength within the radiation system--consisting of all University buildings serviced with direct current from the main power house at Ashmun Street and some additional buildings serviced by alternating current from the United Illuminating Co.--adequate to permit good reception, while limiting radiation outside the system.

A series of tests to determine the status quo of the system showed radiation considerably above the limit. The department proceeded on the assumption that the coaxial cable was the prime offender insofar as excess radiation was concerned. However, a second test was run to validate this assumption. All building wiring was disconnected from the system and the lines were resistively terminated. The major part of the excess radiation disappeared.

This finding necessitated a new approach to the problem. At a conference with Professor F.T. McNamara of the Electrical Engineering Department in September, 1954, the group of station engineers, headed by Lynde E. May IV, discussed the test results. A test was devised involving one of the dormitories, Calhoun College, to determine which part of the building wiring was responsible for the largest part of the radiation. Through the cooperation of the Service Bureau, the test was run despite the fact that it required the services of an electrician and the disruption of electric service to Calhoun for the better part of the afternoon. Field strength readings indicated two surprising facts: 1) most of the radiation was coming from the individual branch power circuit to which the coax was connected, and an additional large amount was coming from the long feeder from the power plant; 2) surprisingly little radiation was emanating from the remainder of the wiring of the college.

The solution was now relatively obvious. Instead of using the 28 random feed points in existence, all located far out on branch circuit wiring, the signal should be inserted at main switchboard points. It was already known that much of the inefficiency of the existing system was due to signal being inserted only across 110 volts or one side of the 220-volt three-wire supply. Hence, all insertion would now be made across 220 volts. And a system would be devised whereby the phase of the radio-frequency signal would be reversed on each side of the main feeders from the power plant, the hope being that radiation from this source would cancel itself.

An experimental version of the circuit (figure 1) was constructed and tests were again run on Calhoun. Results

were beyond wildest expectations: more than adequate service was provided within the rooms; negligible radiation existed outside the college. The major physical work of the project lay in relocating between 500 and 1000 feet of coaxial cable to new insertion points, building up and installing thirteen tuning units, and tuning each. Since each switchboard and its associated service area was different, each was assentially a special case requiring special attention and slight modifications of the circuit values. The impedance of the power lines was found, as suspected, to vary with different loads. This problem is practically insoluble, so the compromise was to tune the circuits for night operation, which was found to be a satisfactory procedure.

The cost of the system revision approached two thousand dollars.

Preliminary field strength tests were made which showed an area of excessive signal only on the New Haven Green. This was eliminated by additional shielding of the transmitter, and Professor McNamara certified the final result on Octover 20, 1954.

This left a transmission system consisting of about five miles of RG 8/U coaxial cable with a nominal impedance of 52 ohms. The line is installed to afford signal transfer to a maximum number of points with the minimum amount of cable. Therefore, the system resembles a tree, with the transmitters at the roots and the termination points at the ends of the branches. Junctions consist of Amphenol "Y" connectors cascaded to provide as many as five branches. While it is true that this type of branching badly mismatches the whole system, WYBC found that satisfactory transmission resulted.

William Massy, WYBC's Technical Director in 1956, observed, "It is generally thought that radiation from coax line itself increases drastically as the standing wave ratio and that an unmatched line would produce unfortunate amounts of radiation." If the shield is well-grounded r.f.-wise (to water pipes, for instance) at points less than a quarter-wavelength apart, the external radiation will be eliminated, he reported.

WYBC inserts r.f. signal into the university dormitories at thirteen points. In general, these tuning units consist of a series resonant circuit, with the constants of the power lines themselves acting both as primary reactive elements and as loads.

The method used to determine the component values of the individual units follows. The values of power line reactance as seen by the tuned circuits varies with location, thus making it necessary to perform these operations for each individual case (we noted that these values ranged from about 30 mh inductance to 1000 uufd capactiance.)

1) Take test circuit to desired location and connect it to the power lines in the desired manner. He found

that the values listed on the schematic were generally satisfactory for this first test.

2) Connect VTVM across the secondary of the r.f. transformer. Peak reading means that the circuit is in resonance.

3) Add C_2 until resonance occurs in the range of C_1. Note the value of C_2 needed. The reactance of the power lines can then be computed by the usual equations. Yale found that the circuit worked satisfactorily with about 1000 ufd total capacitance. WYBC wound its own coils to give the required inductance, using toroidal powdered iron coil forms from a private source.

The capacitor on the primary side of the coil is used generally in testing for dc shorts on the coaxial branch. The capacitor in the conductor from local AC ground prevents 60 cycle imbalances from setting up currents in the r.f. shield.

During the year which WYBC-TV was in operation, the output of a VHF amplifier was fed into the coaxial system in series with the WYBC transmitter. At each tuning unit, the VHF signal was removed and piped into the common room TV set.

With the advent of WYBC-A, the classical music affiliate operating on 540 kc, a diplexer was constructed so that the two r.f. signals could be distributed over the same coaxial system. The tuning units are still tuned, however, for 640 kc.

In summary, the unique features of the WYBC transmission system are:

1) Coaxial lines are not matched; grounding of the shield at quarterwave points prevents spurious radiation.

2) RF is inserted in building wiring across 220-volts at main switchboard in each dormitory; each side of the 220-volt circuit is driven out of phase to prevent radiation from wiring and to break up standing wave patterns in the buildings themselves.

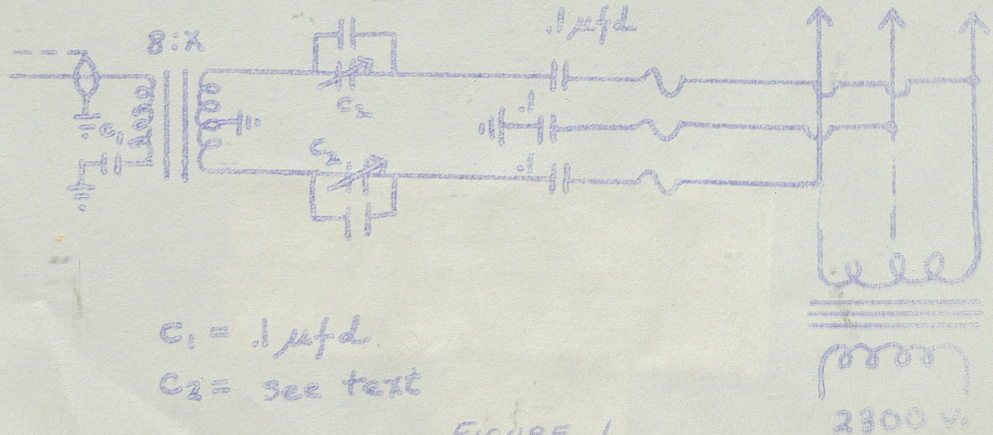

FIGURE 1

Chairman of Board
Yale Broadcast. Co. Inc.
242-A Yale Station
New Haven, Connecticut